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(71) Applicant(s)

**Peter Burden**  
32 Plymyard Avenue, Bromborough, Wirral,  
Merseyside, L62 6BN, United Kingdom

(72) Inventor(s)

**Peter Burden**

(74) Agent and/or Address for Service

**Peter Burden**  
32 Plymyard Avenue, Bromborough, Wirral,  
Merseyside, L62 6BN, United Kingdom

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(56) Documents Cited

US 4152553 A

(58) Field of Search

UK CL (Edition N) A3V V13A, H4J JA JAX JDQ JDS  
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H04R 1/10 5/033  
Online databases: WPI, JAPIO, Claims

## (54) Headgear communications without earphones

(57) An audio vibrator 2, 4 is attached to a rigid part of the headgear, which part then transfers the vibrations to the rest of the headgear. The rigid parts produce audible sound for the ears, whilst those parts in contact with the skull can transmit vibrations via the bone structure, direct to the inner ears.

The vibrator may be mounted without having to modify the structure or components of the headgear, so preserving any built-in safety features and complying with existing standards.

The above can be used in conjunction with a microphone to allow transmission of two way speech.

Fig 1

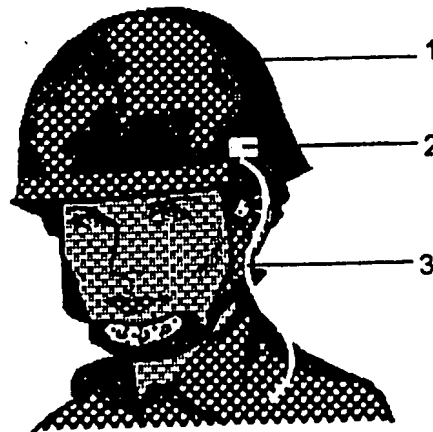
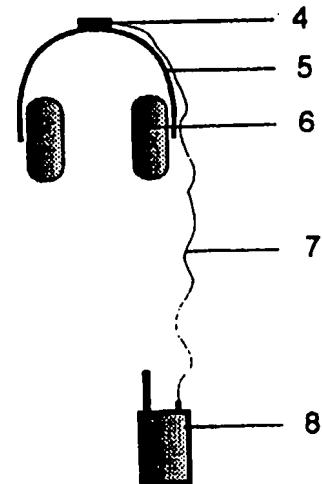


Fig 2



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Fig 1

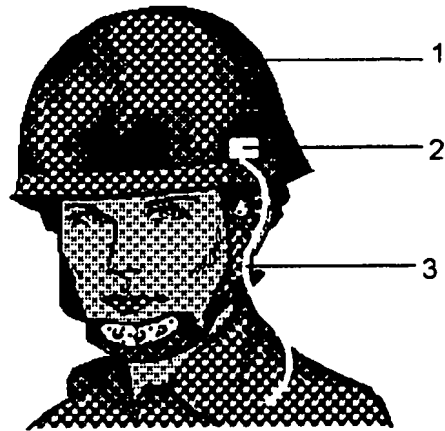


Fig 2

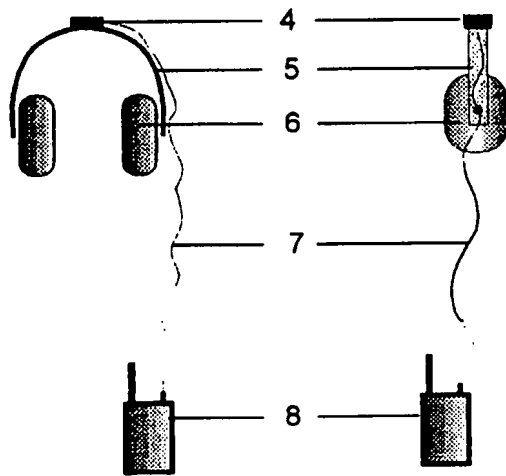
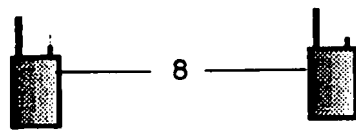


Fig 3



**HEADGEAR COMMUNICATIONS WITHOUT EARPHONES**

This invention is a method of reproducing speech, tones or music for the wearers of helmets, ear defenders or other protective headgear.

The usual method of communicating with a wearer of protective headgear is to either provide specially designed headgear, or to modify standard equipment by adding an audio headset or earphones. The latter can cause problems with safety and user convenience, (specially where health and safety standards are mandatory)

The advantage of this invention is that it works without modification to standard headgear. Thus enabling hazard warning, instructions, training, information messages and music (if so desired) to be heard by the wearers of any protective headgear.

The present invention vibrates the headgear to make its constituent parts produce sound directly, without the intermediary of speakers or earphones. An audio vibrator is attached to a rigid part of the headgear, which part then transfers the vibrations to the rest of the headgear. The rigid parts, in vibrating, produce sound for the outer ears, whilst those parts in contact with the skull can transmit vibrations, via the bone structure, direct to the inner ears.

The vibrator may be mounted without having to modify the structure or components of the headgear, so preserving the inherent safety features without contravention of existing standards.

The above can be used in conjunction with a microphone to allow transmission of two way speech.

Two specific embodiments of the invention will now be described:-

**1. HELMETS OR HARDHATS (reference Figure 1)**

An audio vibrator 2 is attached to the hard surface of the helmet shell 1 with straps, or adhesive pads or other fixtures, so that a constant pressure is maintained between the vibrator 2 and the helmet shell 1. The helmet then converts the vibrations to audible sound.

The audio vibrator 1 is connected, by cable 3, to a radio, cassette player or other signal source.

An optional microphone may be added for speech transmission.

**2. EARMUFFS OR EARDEFENDERS (reference Figures 2 & 3)**

An audio vibrator 4 is attached to the hard surface of the headband 5 with straps, or adhesive pads or other fixtures, such that a constant pressure is maintained between the vibrator 4 and the headband 5. The headband 5 conducts the vibrations, via the earmuff pivots, to the earmuff shells 6 - which convert the vibrations to audible sound. Optionally the vibrator 4 may be attached direct to the earmuff shell. The audio vibrator 1 is connected, by cable 3, to a radio, cassette player or other signal source.

An optional microphone may be added for speech transmission.

## CLAIMS

1. A method of producing audible sound within protective headgear through its' inherent structure, components and materials. In which an audio vibrator is attached to a rigid part of the headgear, which part then transfers the vibrations to the rest of the headgear. The rigid parts, by vibrating, produce sound for the ears, whilst those parts in contact with the skull can transmit vibrations, via the bone structure, direct to the inner ears.
2. The vibrator as claimed in claim 1 may be mounted on helmets or hardhats, by means of straps or other fastenings. This enables any standard helmet or hardhat to receive audio communications.
3. The vibrator as claimed in claim 1 may be mounted on Earmuffs or Eardefenders, by means of straps or other fastenings. This enables any standard Earmuff or Eardefender to receive audio communications.
4. The method claimed in claims 1,2 & 3 may be used in conjunction with a microphone to facilitate speech transmission by the wearer.

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**Patents Act 1977**  
**Examiner's report to the Comptroller under Section 17**  
**(The Search report)**

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**Relevant Technical Fields**

- (i) UK Cl (Ed.N)      H4J (JA, JAX, JDQ, JDS); A3V (VBA)  
(ii) Int Cl (Ed.6)      A42B 3/16, 3/30; A61F 11/14; H04M 1/05;  
H04R 1/10, 5/033

Search Examiner  
MR P J EASTERFIELD

Date of completion of Search  
2 FEBRUARY 1995

**Databases (see below)**

- (i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-  
1 to 4

**(ii) ONLINE DATABASES: WPI, JAPIO, CLAIMS**

**Categories of documents**

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|---|---|
| <b>X:</b> Document indicating lack of novelty or of inventive step.   | <b>P:</b> Document published on or after the declared priority date but before the filing date of the present application.        |
| <b>Y:</b> Document indicating lack of inventive step if combined with one or more other documents of the same category. | <b>E:</b> Patent document published on or after, but with priority date earlier than, the filing date of the present application. |
| <b>A:</b> Document indicating technological background and/or state of the art.   | <b>&amp;:</b> Member of the same patent family; corresponding document.   |

Category	Identity of document and relevant passages	Relevant to claim(s)
X	US 4152553 A (WHITE)	1,2,4

**Databases:** The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).